

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT				1. Contract ID Code Cost-Plus-Fixed-Fee		Page 1 Of 8	
2. Amendment/Modification No. P00006		3. Effective Date 2004AUG19		4. Requisition/Purchase Req No. SEE SCHEDULE		5. Project No. (If applicable)	
6. Issued By TACOM WARREN AMSTA-AQ-ABGD PHILLIP LAWRENCE (586)574-5273 WARREN, MICHIGAN 48397-5000 HTTP://CONTRACTING.TACOM.ARMY.MIL EMAIL: LAWRENCPT@TACOM.ARMY.MIL		Code W56HZV		7. Administered By (If other than Item 6) DCMA DETROIT U.S. ARMY TANK & AUTOMOTIVE COMMAND (TACOM) ATTN: DCMAE-GJD WARREN, MI 48397-5000		Code S2305A	
				SCD C PAS NONE ADP PT HQ0337			
8. Name And Address Of Contractor (No., Street, City, County, State and Zip Code) TURING ASSOCIATES, INC. 1392 HONEY RUN DRIVE ANN ARBOR, MI. 48103-9343				<input type="checkbox"/>		9A. Amendment Of Solicitation No.	
				<input type="checkbox"/>		9B. Dated (See Item 11)	
				<input checked="" type="checkbox"/>		10A. Modification Of Contract/Order No. DAAE07-01-C-L066	
TYPE BUSINESS: Other Small Business Performing in U.S.				<input type="checkbox"/>		10B. Dated (See Item 13) 2001JUL17	
Code 07XR7		Facility Code					
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS							
<input type="checkbox"/> The above numbered solicitation is amended as set forth in item 14. The hour and date specified for receipt of Offers <input type="checkbox"/> is extended, <input type="checkbox"/> is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing items 8 and 15, and returning _____ copies of the amendments: (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.							
12. Accounting And Appropriation Data (If required) ACRN: AE NET INCREASE: \$106,322.00							
13. THIS ITEM ONLY APPLIES TO MODIFICATIONS OF CONTRACTS/ORDERS It Modifies The Contract/Order No. As Described In Item 14.							
KIND MOD CODE: G							
<input type="checkbox"/> A. This Change Order is Issued Pursuant To: The Changes Set Forth In Item 14 Are Made In The Contract/Order No. In Item 10A.							
<input type="checkbox"/> B. The Above Numbered Contract/Order Is Modified To Reflect The Administrative Changes (such as changes in paying office, appropriation data, etc.) Set Forth In Item 14, Pursuant To The Authority of FAR 43.103(b).							
<input checked="" type="checkbox"/> C. This Supplemental Agreement Is Entered Into Pursuant To Authority Of: Changes Clause #I-54 in the contrac							
<input type="checkbox"/> D. Other (Specify type of modification and authority)							
E. IMPORTANT: Contractor <input type="checkbox"/> is not, <input checked="" type="checkbox"/> is required to sign this document and return _____ copies to the Issuing Office.							
14. Description Of Amendment/Modification (Organized by UCF section headings, including solicitation/contract subject matter where feasible.) SEE SECOND PAGE FOR DESCRIPTION							
Contract Expiration Date: 2005NOV30							
Except as provided herein, all terms and conditions of the document referenced in item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.							
15A. Name And Title Of Signer (Type or print)				16A. Name And Title Of Contracting Officer (Type or print) MICHAEL L. CIONI CIONIM@TACOM.ARMY.MIL (586)574-7070			
15B. Contractor/Offeror (Signature of person authorized to sign)		15C. Date Signed		16B. United States Of America By _____ /SIGNED/ (Signature of Contracting Officer)		16C. Date Signed 2004AUG19	
NSN 7540-01-152-8070 PREVIOUS EDITIONS UNUSABLE				30-105-02		STANDARD FORM 30 (REV. 10-83) Prescribed by GSA FAR (48 CFR) 53.243	

SECTION A - SUPPLEMENTAL INFORMATION
PROGRAM: Intelligent Mobility Laboratory

PURPOSE OF MODIFICATION: Additional Scope

PRIOR CONTRACT AMOUNT: \$ 483,045.00

CONTRACT AMOUNT REVISED THIS ACTION:\$ 106,322.00

CURRENT CONTRACT AMOUNT: \$ 589,367.00

This is a bi-lateral modification

The purpose of this modification is to incorporate revisions to the Scope of Work pursuant to FAR 52.243-2, Changes- Cost Reimbursement (ALT V), as follows:

1. Section B is updated to reflect the incorporation of \$106,322.00 under CLIN 0001AE.
2. Section B, paragraph B.4 of the contract, is revised to reflect the increase in the obligated amount to \$589,367.
3. Section C of the contract is revised to reflect the changes in paragraph C.2.1.1 and the addition of paragraph C.2.2.3.1.
4. Section F, paragrpah F.2, of the contract is revised to reflect the change in completion date.
5. Section G is updated to reflect the incorporation of the applicable accounting data.
6. As a result of this action the total contract amount is increased as follows:

	<u>Previous Contract Amount</u>	<u>Amount this Action</u>	<u>Total Amount</u>
Estimated Cost:	\$467,165	\$100,675	\$567,840
Fixed Fee:	\$ 15,880	\$ 5,647	\$ 21,527
Total CPFF:	\$483,045	\$106,322	\$589,367

7. All other terms and conditions of this contract, as previously modified, remained unchanged and in full force and effect.

Name of Offeror or Contractor: TURING ASSOCIATES, INC.

ITEM NO	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001	SECTION B - SUPPLIES OR SERVICES AND PRICES/COSTS <u>SERVICES LINE ITEM</u> SECURITY CLASS: Unclassified The negotiated cost of the contract is: Estimated Cost: \$567,840 Fixed Fee: \$ 21,527 Total CPFF: \$589,367 (End of narrative B002)				
0001AE	<u>SERVICES LINE ITEM</u> NOUN: TANK & AUTO TECHNOLOGY PRON: R342V018R3 PRON AMD: 01 ACRN: AE AMS CD: 622601H9111 <u>Inspection and Acceptance</u> INSPECTION: Destination ACCEPTANCE: Destination <u>Deliveries or Performance</u> DLVR SCH				

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B.1 Estimated Cost and Payment

B.1.1 The estimated cost for performance of the work required under this contract is \$589,367.00 which shall constitute the estimated cost for the purpose of the Contract Clause hereof entitled LIMITATION OF FUNDS.

B.1.2 The contractor will be paid for the fixed fee stated in Section B opposite CLIN 0001 for the performance of work under the contract and in accordance with the terms of the Contract Clause entitled FIXED FEE, (Feb 1998), FAR 52.216-8. The fixed fee together with the reimbursement of cost shall constitute full and complete consideration for the contractor's service in connection with the work required and performed under this contract.

B.1.3 Allowable cost shall be determined, and payment thereof shall be provided, in accordance with the Contract Clause hereof entitled ALLOWABLE COST AND PAYMENT.

B.2 Payment

The contractor may submit public vouchers bi-monthly for payment under this contract. The fee will be payable at the time of reimbursement of cost at the same rate to such cost as the total fee of this contract bears to the total estimated cost thereof, subject to any withholding pursuant to provisions of this contract. The Paying Office shall disburse funds in accordance with the paragraph H.18 of this contract entitled "Special Instructions - Pay Oldest Money First (MAR2000)".

B.3 Funding

B.3.1 The Government shall provide funds under this contract covering the estimated cost hereof on an incremental basis as provided for in the following funding schedule and pursuant to the Contract Clause entitled LIMITATION OF FUNDS. It is estimated that the incremental amounts are sufficient for the performance of work in each of cited periods. The Government may, at its discretion, obligate such funds on an incremental basis within each fiscal year. The contractor shall so plan and execute the work required by this contract as to expend and/or commit funds compatible with the schedule set forth below. Whenever the contractor has reason to believe that the funds obligated to this contract for any fiscal year are either insufficient or excessive for the performance of work required in that fiscal year, the Government shall be so notified.

B.4 Funds Obligated. The amount of funds currently obligated to this contract is \$ 589,367.00

*** END OF NARRATIVE B 001 ***

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Name of Offeror or Contractor: TURING ASSOCIATES, INC.

SECTION C - DESCRIPTION/SPECIFICATIONS/WORK STATEMENT
SECTION C
SCOPE OF WORK

C.1 Objectives.

C.1.1 The objective of this effort is to develop an Intelligent Mobility Laboratory at TARDEC to measure and evaluate robotic and semi-autonomous mobility in lightweight unmanned ground vehicles. The effort is organized into the following three tasks:

- Task 1: Performance Metrics and Evaluation Methodologies
- Task 2: System and Infrastructure Design and Integration
- Task 3: Demonstration and Validation.

C.2 Tasks:

C.2.1 Under Task 1 the Contractor shall define the system-level and subsystem-level intelligent mobility capabilities and their associated performance metrics to use as the basis for standards, specifications and evaluation.

C.2.1.1 In order to fulfill the current evaluation methodologies, the contractor shall identify and evaluate subsystems/components/technologies to enhance the capability of vehicle inspections..

C.2.1.2 The Contractor shall report the results of their work under Task 1 in their second monthly Progress, Status, and Management report CDRL A001 of this contract due sixty (60) days after contract award.

C.2.2 Under Task 2 the Contractor shall design, deliver, and integrate a suite of equipment (see Laboratory Equipment List located at Attachment 001 to Section J) at the TARDEC Intelligent Mobility Laboratory to conduct a wide variety of intelligent mobility tests, to evaluate performance metrics and to establish the validity of laboratory experiments for extrapolation to natural indoor and outdoor conditions.

C.2.2.1 The Contractor shall develop and deliver to the TARDEC Intelligent Mobility Laboratory a suite of terrain surface materials and obstacle structure modules that can be configured to create a wide variety of intelligent mobility test conditions as needed to evaluate the performance metrics of task 1. The terrain surface materials shall represent a wide range of geometric configurations and shape/size combinations, including individual and serial positive and negative obstacles, staircases, confined spaces, level and sloped orientation.

C.2.2.2 The Contractor shall provide three light-weight (under 15 lbs. gross vehicle weight) mobile robot research platforms, and two middle-weight (15 to 100 lbs. gross vehicle weight) all terrain mobile robot research platforms. The light-weight platforms shall be suitable for research in cooperative and evolutionary robotics on flat terrain. The middle-weight platforms shall be suitable for off-road intelligent mobility research. The platforms shall have high-bandwidth wireless communication. The platforms shall have the ability to serve a variety of functions in the laboratory. They shall have the ability to be used as surrogate vehicles to test alternative algorithms and components. They shall have the ability to be used for scalability studies, and provide a reference baseline for robot mobility. The platforms shall be highly modular, with an open-architecture to facilitate interfaces. The platforms shall also be able to be operated remotely by an operator or off-board computer, or operate autonomously. The contractor shall provide control and drive components for assembly of 2 mobile robots with different locomotion mechanisms, and with the power to carry payloads up to 100 lbs. on a level surface. Assembly components shall also include microcontrollers, servos, drives, actuators, radio interfaces and other components necessary for construction and testing of the mobile robots with different locomotion and control mechanisms.

C.2.2.3 The Contractor shall provide hardware and software to instrument the TARDEC intelligent mobility laboratory, to conduct tests and experiments with mobile robot technologies, to analyze test data and evaluate performance metrics, to simulate robotic vehicles and sub-systems, and to support virtual reality interaction and display. On-board instrumentation, which provides data on the vehicle navigation and driving from the vehicle perspective, shall have the capability to be interfaced to the robot's computer for autonomous operation or displayed to the human controller for tele-operation. Off-board instrumentation shall provide position tracking, tractive force measurement and other performance data collection from the fixed-earth perspective. This capability shall be designed to support model-based data analysis and virtual prototyping with dynamics simulation models, and shall include visualization capabilities to display the simulations and replay experiments. See attachment 1 to Section J for an itemized list of laboratory equipment.

C.2.2.3.1 The Contractor shall research, develop, and deliver hardware, software, and procedures to the TARDEC robotics laboratory extending the current capabilities of field mobile robots for vehicle inspections and physical security. In order to provide vehicle navigation and display feedback, enhancements will explore the current capability of small robots to inspect vehicles from automobiles to semi-trucks for contraband such as explosives,

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chemical, biological, radiological, toxic, and hazardous materials. Both on and off-board sensory instrumentation will be utilized to gather additional vehical data and provide adequate feedback to the controller/soldier. On-board instrumentation shall include a mast and/or robot arm systems, modular interfaces for alternative sensor packages, and human interface methods for both driving and mast/arm control, including hands-free, supervisory control, automatic and semi-automatic behaviors. To expand the performance metrics, the Contractor shall identify opportunities for modular designs to reduce cost and improve maintainability. Cost-effectiveness tradeoffs for alternative system and subsystem designs and components will also be delivered.

C.2.2.4 The Contractor shall provide confirmation of the delivery and operability of the required hardware in the 10th monthly Progress, Status and Management report CDRL# A001. The specific hardware to be delivered under Task 2 are: Surrogate Terrain and Obstacles, Mobile Robot Platforms, On-board instrumentation, Off-board instrumentation, and Data Analysis, Simulation and Visualization Computer System. All of the aforementioned hardware is required to be delivered within 10 months of contract award.

C.2.3 Under Task 3, Test and Validation Procedures, the Contractor shall outline and demonstrate experimental procedures to address current issues in intelligent mobility technologies, to highlight the capabilities of the laboratory, and to establish the validity of laboratory results for extrapolation to real-world conditions. The experimental procedures shall be selected to complement, or leverage, other unmanned ground vehicle test and development activities in which the TARDEC Intelligent Mobility Laboratory is in participation. The test demonstration procedures shall be written up and presented to the COR & PCO 30 days before demo procedures occur.

C.2.3.1. Results of Task 3 shall be detailed in the contractors Final scientific and Technical Report, CDRL #A003 due at the completion of the contract (24th month)

C.3 Deliverables

C.3.1. The list of hardware deliverables are as follows:(see also Attachment 001 to Section J of this Contract).

- a. Surrogate Terrain and Obstacles (C.2.2.1)
- b. Mobile Robot Platforms (C.2.2.2)
- c. On-board Instrumentation (C.2.2.3)
- d. off-board Instrumentation (C.2.2.3)
- e. Data Analysis, Simulation and Visualization Computer System(C.2.2.3)

C.3.1.1 All of the above items will be delivered on or by their due date specified in Section F of this Contract.

C.3.2 Start of Work Meeting. The Contractor shall host a start of work meeting at the contractor's facility within 45 days of contract award. Attendees will be as mutually agreed between the contractor's Program Director and the TACOM-TARDEC COR. The Contractor shall prepare a brief (one-page) summary of issues with any corrections required as identified at the start of work meeting prior to departure of the attendees.

C.3.3 Contractor's Monthly Progress, Status and Management Report. The contractor shall deliver monthly Technical Progress Reports in Contractor's format, compliant with the Data Item Description DI-MGMT-80227 and the Contract Data Requirements List (CDRL DD Form 1423) A001.

C.3.4. Cost Status Reports. The contractor shall deliver monthly cost status reports in contractor format, compliant with the Data Item Description DI-FNCL-80912 and the Contract Data Requirements List (CDRL DD Form 1423) A002 .

C.3.5 Final Report. At the completion of all 3 tasks, 30 days prior to the end of the contract period of performance, the contractor shall submit a draft technical report, which will include detailed listings of all the results of the program in contractors format and compliant with the Data Item Description (DID) DI-MISC-80711 (T) and the Contract Data Requirements List (CDRL DD Form 1423) A003. TACOM-TARDEC will review, comment and return the draft technical report to the contractor within ten working days. The contractor shall update the draft, incorporate comments and return the final report within 10 days of receipt of comments. See also Clause H-14 (Final Scientific or Technical Report 252.235-7011) of this contract.

*** END OF NARRATIVE C 001 ***

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SECTION F - DELIVERIES OR PERFORMANCE

F.1.1 Data

F.1.2 The delivery schedule for the data items is found on Exhibit A, The Contract Data Requirements List (DD Form 1423).

F.1.3. All data deliverables under this contract shall be delivered electronically to the email addresses specified in the Contract Data Requirements List (CDRL) DD Form 1423.

F.2 Period of Performance

The period of performance of this contract is from contract award through 30 November 2005.

F.3 All hardware and hardcopy documents shall be shipped FOB Destination to the following address:

U.S.Army TACOM
Attn: AMSTA-TR-R/ (Henry Andrusz)
Mailstop 263
6501 E. 11 Mile Road
Warren, MI 48397-5000

All other deliverables must be sent by e-mail to the following addresses unless alternative arrangements are made with the Contracting Officer's Representative:

andruszh@tacom.army.mil, and lawrencp@tacom.army.mil.

F.3.1 The contractor shall deliver the following:

Cost Reports:	Monthly Paragraph C.3.4
Progress, Status, and Management Reports:	Quarterly Paragraph C.3.3
Surrogate Terrain and Obstacles	10 Months after award Para. C.2.2.1
Mobile Robot Platforms:	10 Months after award Para. C.c.2.2
On-board Instrumentation	10 Months after award Para. C.2.2.3
Off-board Instrumentation	10 Months after award Para. C.2.2.3
Data Analysis, Simulation and Visualization Computer System	10 Months after award Para. C.2.2.3
Laboratory Equipment	10 months after award Attch 001 to Section J
Demonstration/Validation	30 days prior to demo.Para C.2.3
Final Technical Report	14 Months after award Para C.2.2.3.1

*** END OF NARRATIVE F 001 ***

SECTION G - CONTRACT ADMINISTRATION DATA

LINE	PRON/ AMS CD/ <u>ITEM</u> <u>MIPR</u>		OBLG STAT/ <u>JOB ORD NO</u>			INCREASE/DECREASE <u>AMOUNT</u>		CUMULATIVE <u>AMOUNT</u>
0001AE	R342V018R3	AE	2	\$	0.00	\$	106,322.00	\$ 106,322.00
	622601H9111		42V018					
					NET CHANGE	\$	106,322.00	

SERVICE <u>NAME</u>	NET CHANGE <u>BY ACRN</u>		<u>ACCOUNTING CLASSIFICATION</u>			ACCOUNTING <u>STATION</u>		INCREASE/DECREASE <u>AMOUNT</u>
Army	AE	21	42040000046N6N7EP622601255Y	S20113		W56HZV	\$	<u>106,322.00</u>
					NET CHANGE	\$		106,322.00

		PRIOR AMOUNT <u>OF AWARD</u>		INCREASE/DECREASE <u>AMOUNT</u>		CUMULATIVE <u>OBLIG AMT</u>
NET CHANGE FOR AWARD:	\$	483,045.00	\$	106,322.00	\$	589,367.00